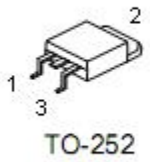
1. General Features

- Proprietary New Trench Technology
- $R_{DS(ON),typ.}$=6.5mΩ@V_{GS}=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

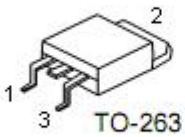
2. Applications

- High efficiency DC/DC converters
- Synchronous Rectification
- UPS Inverter

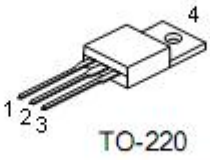
3. Pin configuration



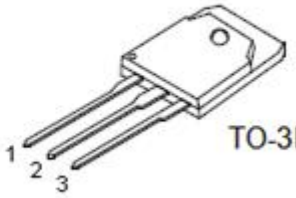
TO-252



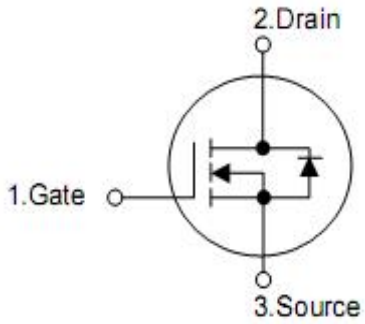
TO-263



TO-220



TO-3P



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KND3208A	TO-252	KIA
KNB3208A	TO-263	KIA
KNP3208A	TO-220	KIA
KNH3208A	TO-3P	KIA

5. Absolute maximum ratings

(T_C= 25 ºC , unless otherwise specified)

Symbol	Parameter	Rating			Unit
		TO-252	TO-263/220	TO-3P	
V_{DSS}	Drain-to-Source Voltage[1]	85			V
V_{GSS}	Gate-to-Source Voltage	±20			
I_D	Continuous Drain Current[2]	100*	100	100	A
	Continuous Drain Current@T_C=100 ºC [3]	70*	70	70	
I_{DM}	Pulsed Drain Current at V_{GS}=10V[2,4]	400*	400	400	
E_{AS}	Single Pulse Avalanche Energy(L=1mH)	612			mJ
dv /dt	Peak Diode Recovery dv/dt[3]	5.0			V/ns
P_D	Power Dissipation	65	189	224	W
	Derating Factor above 25 ºC	0.43	1.3	1.49	W/ ºC
T_L T_{PAK}	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260			ºC
T_J&T_{STG}	Operating and Storage Temperature Range	-55 to 175			

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

* Drain current limited by maximum junction temperature.

6. Thermal characteristics

Symbol	Parameter	Rating			Unit
		TO-252	TO-263/220	TO-3P	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.3	0.79	0.67	ºC /W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	95	62	52	

6. Electrical characteristics

OFF Characteristics		(TJ=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-to-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	85	--	--	V
I_{DSS}	Drain-to-Source Leakage Current	V_{DS}=80V, V_{GS}=0V	--	--	1	uA
		V_{DS}=64V,V_{GS}=0V, T_J=125°C	--	--	100	
I_{GSS}	Gate-to-Source Leakage Current	V_{GS}=+20V,V_{DS}=0V	--	--	+100	nA
		V_{GS}=-20V, V_{DS}=0V	--	--	-100	
ON Characteristics		(TJ=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	V_{GS}=10V, I_D=24A[5]	--	6.5	8.0	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	2.0	--	4.0	V
Dynamic Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHZ	--	3420	--	pF
C_{oss}	Output Capacitance		--	400	--	
C_{rss}	Reverse Transfer Capacitance		--	120	--	
R_g	Gate Series Resistance	f=1.0MHZ	--	2.0	--	Ω
Q_g	Total Gate Charge	V_{DD}=40V, I_D=80A, V_{GS}=0 to 10V	--	61	--	nC
Q_{gs}	Gate-to-Source Charge		--	20	--	
Q_{gd}	Gate-to-Drain (Miller) Charge		--	18	--	
Resistive Switching Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=40V, I_D=80A, V_{GS}= 10V R_G=2.5Ω	--	22	--	nS
t_{rise}	Rise Time		--	24	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	100	--	
t_{fall}	Fall Time		--	32	--	
Source-Drain Body Diode Characteristics		(T_J=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Unit
I_{SD}	Continuous Source Current[2]	Integral PN-diode in MOSFET	--	--	100	A
I_{SM}	Pulsed Source Current[2]		--	--	400	
V_{SD}	Diode Forward Voltage	I_S=80A, V_{GS}=0V	--	--	1.3	V
t_{rr}	Reverse recovery time	V_{GS}=0V ,I_F=20A, diF/dt=100A/μs	--	40	--	ns
Q_{rr}	Reverse recovery charge		--	80	--	uC

Note:
[1] T J =+25 ºC to +175 ºC.
[2] Silicon limited current only.
[3] Package limited current 80A.
[4] Repetitive rating; pulse width limited by maximum junction temperature.
[5] Pulse width≤380μs; duty cycle≤2%.

7. Test circuits and waveforms

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

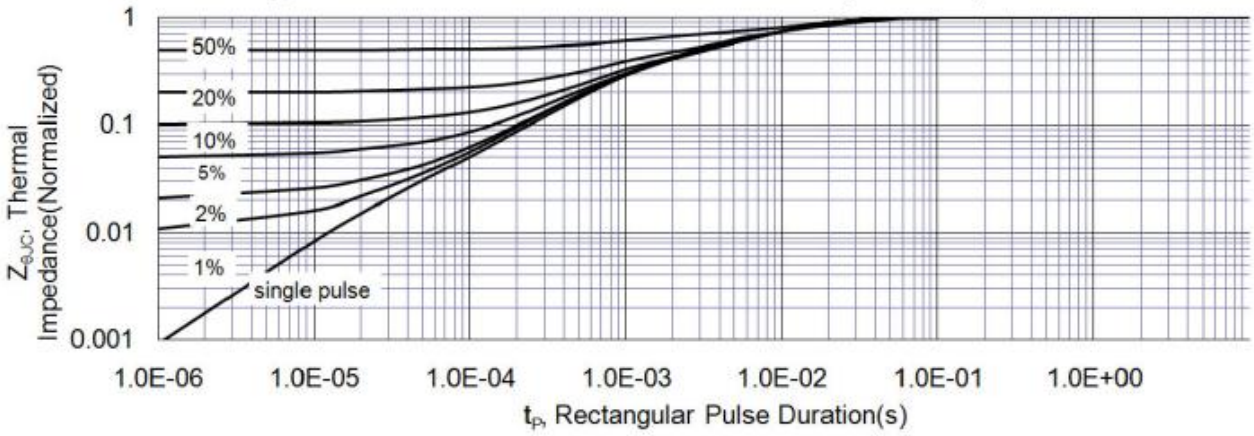


Figure 2. Maximum Power Dissipation vs. Case Temperature

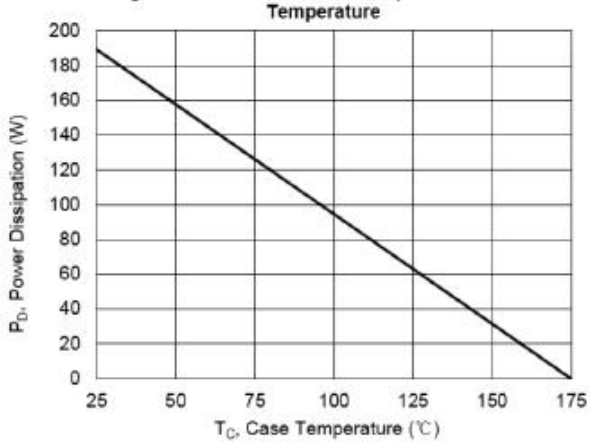


Figure 3 .Maximum Continuous Drain Current vs Tc

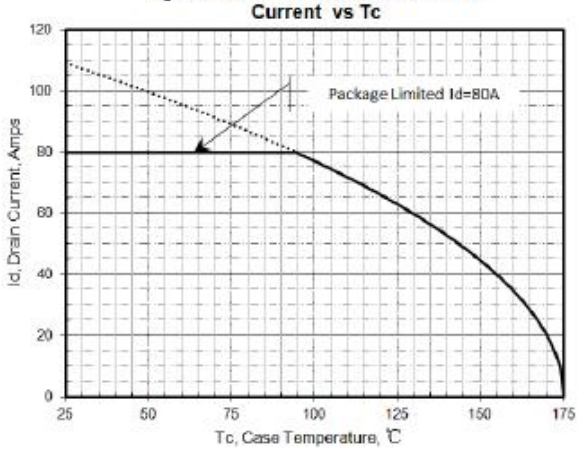


Figure 4. Typical Output Characteristics

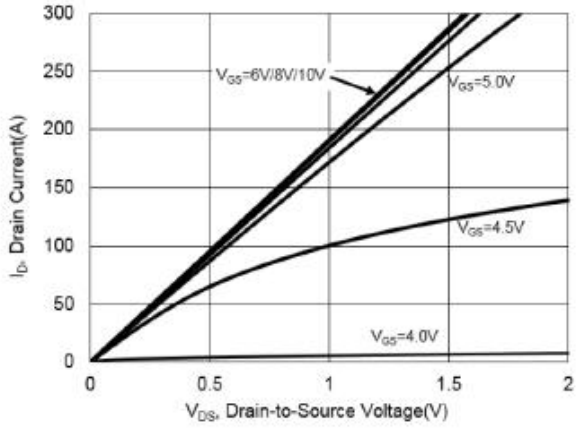


Figure 5. Rdson vs Gate Voltage

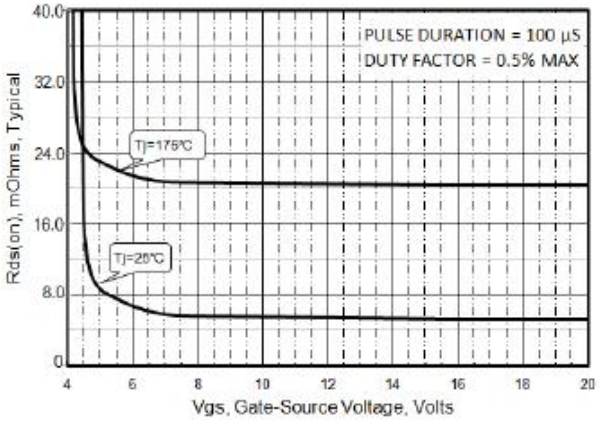


Figure 6. Maximum Peak Current Capability

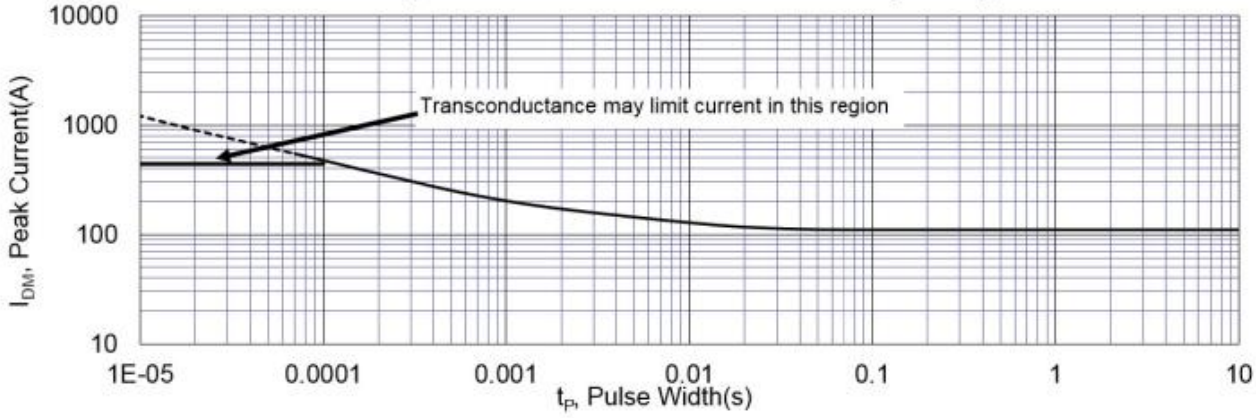


Figure 7. Typical Transfer Characteristics

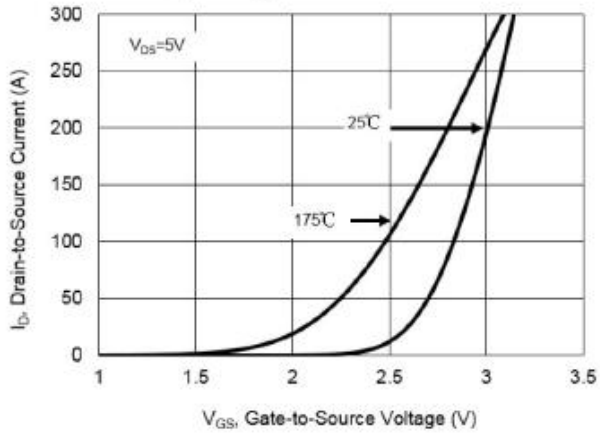


Figure 8. Unclamped Inductive Switching Capability

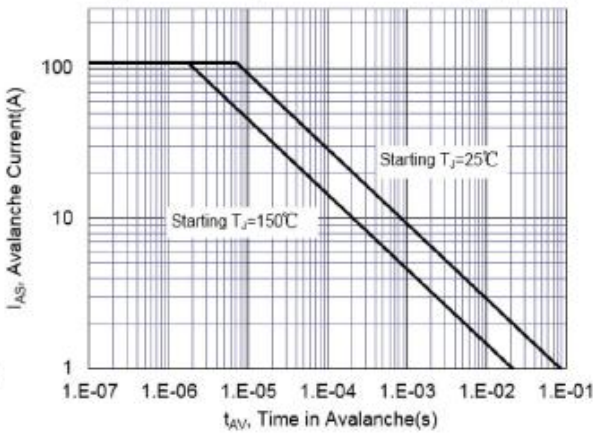


Figure 9. Typical Drain-to-Source ON Resistance

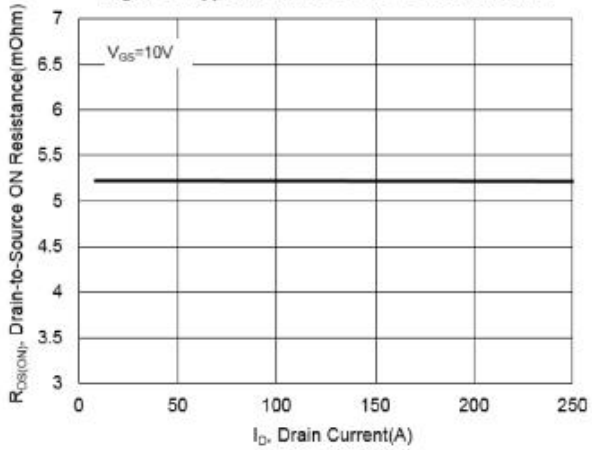


Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

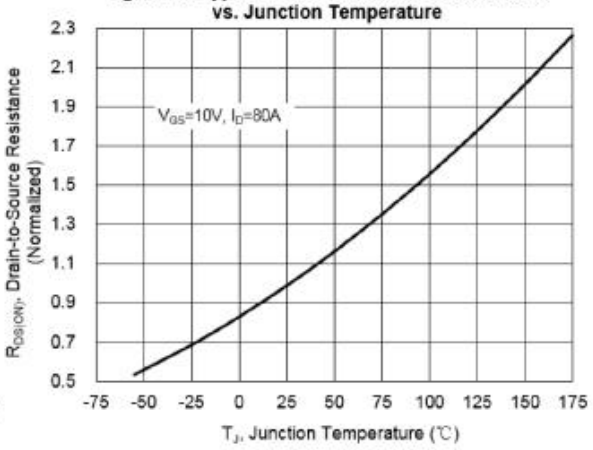


Figure 11.Typical Breakdown Voltage vs. Junction Temperature

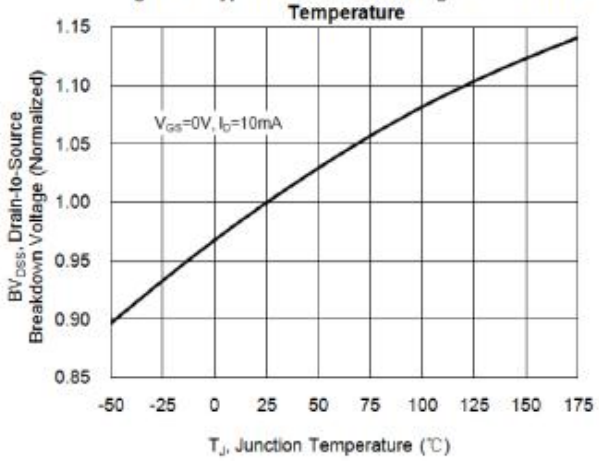


Figure 12.Typical Threshold Voltage vs. Junction Temperature

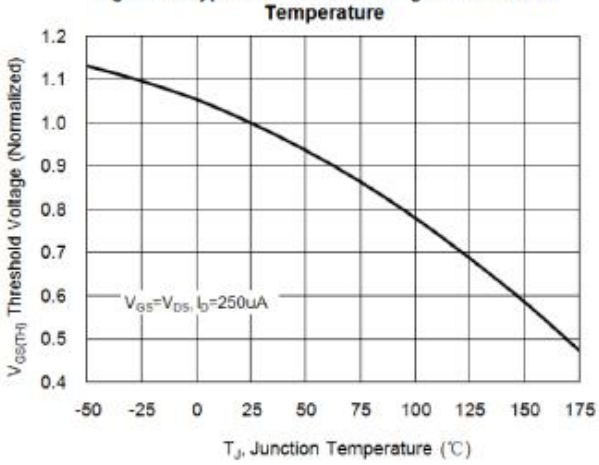


Figure 13. Maximum Forward Safe Operation Area

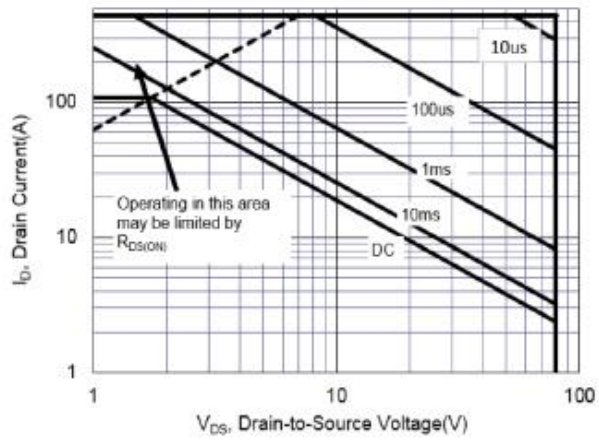


Figure 14. Typical Capacitance vs. Drain-to-Source Voltage

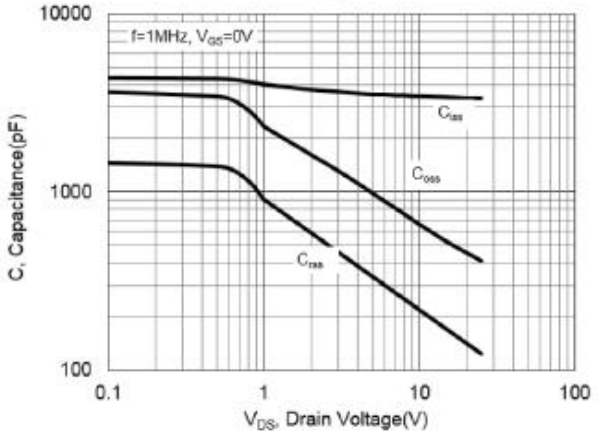


Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

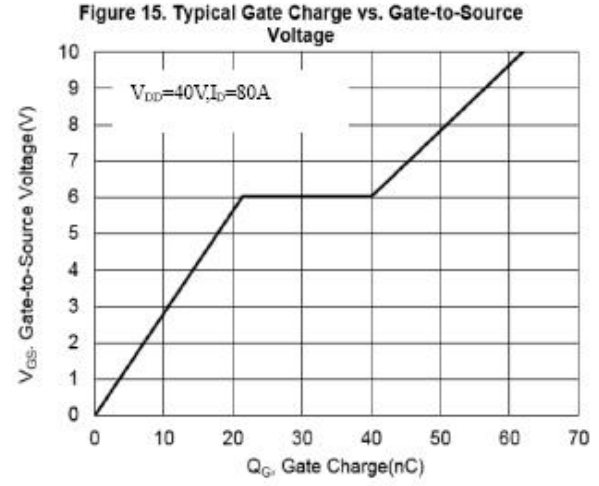
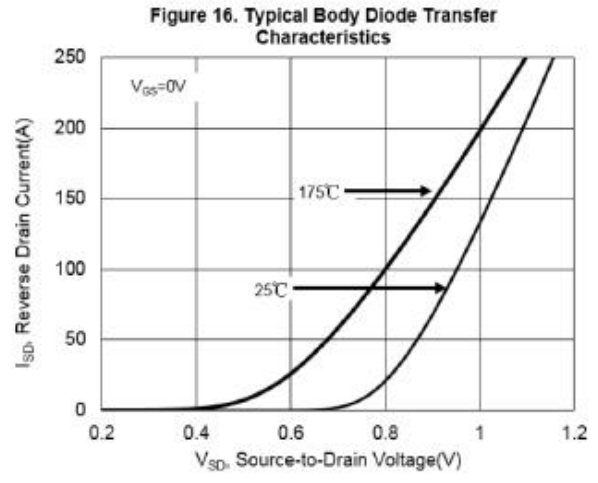


Figure 16. Typical Body Diode Transfer Characteristics



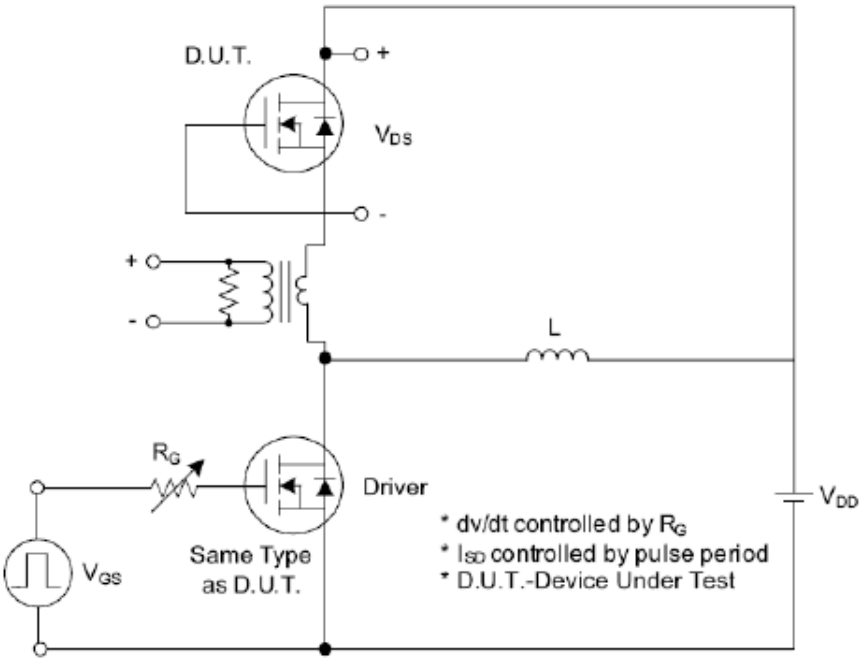


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

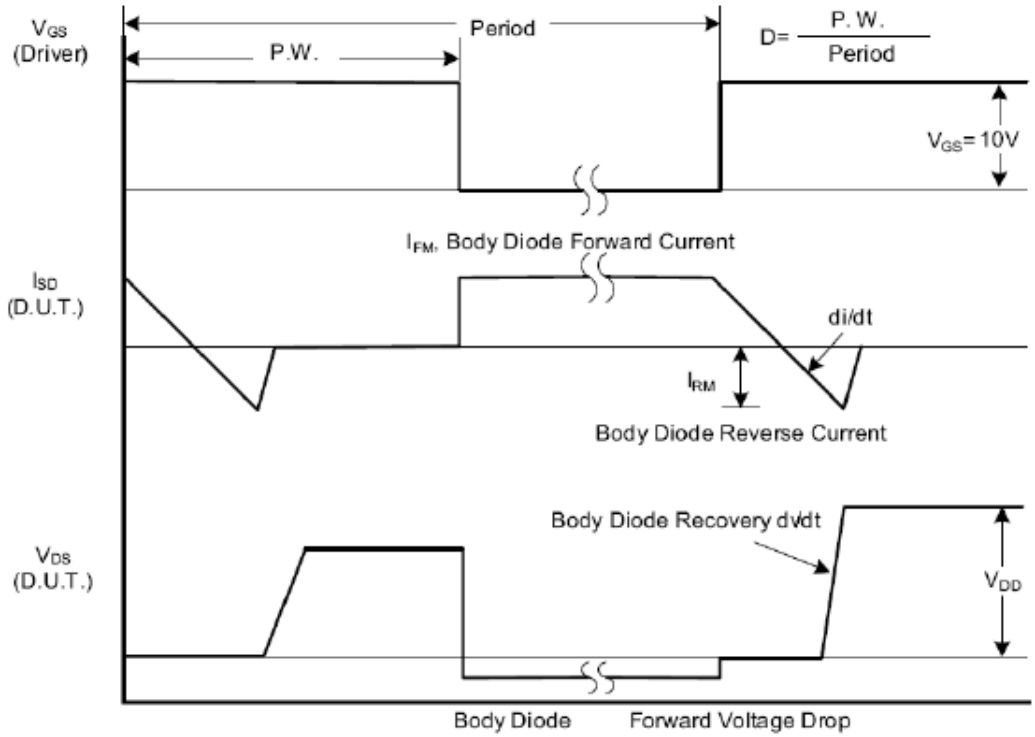


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

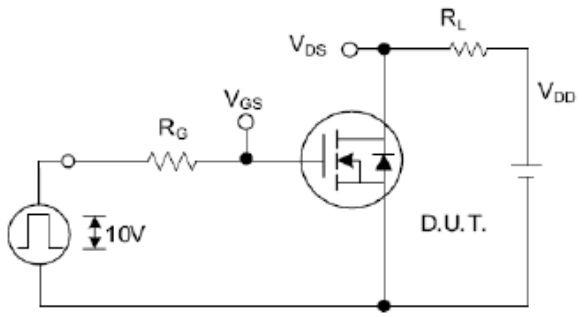


Fig. 2.1 Switching Test Circuit

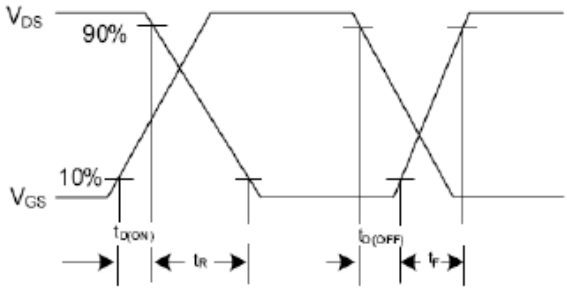


Fig. 2.2 Switching Waveforms

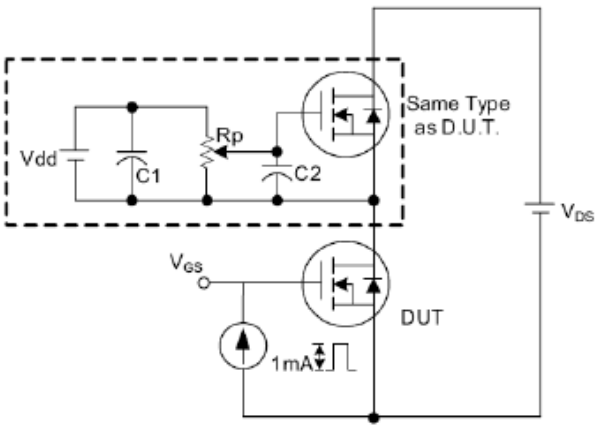


Fig. 3 . 1 Gate Charge Test Circuit

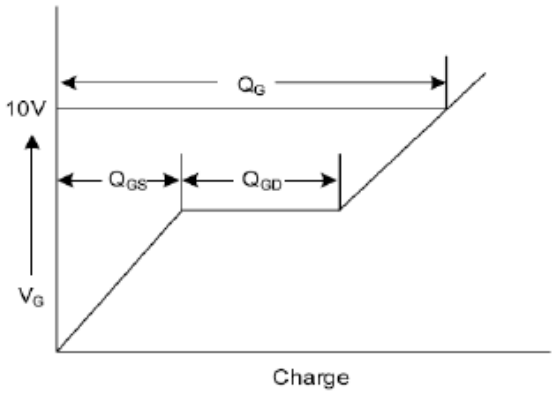


Fig. 3 . 2 Gate Charge Waveform

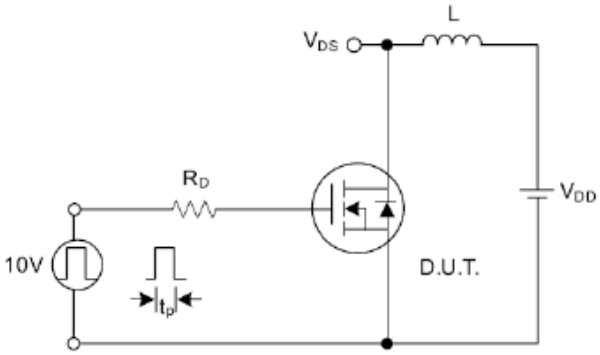


Fig. 4.1 Unclamped Inductive Switching Test Circuit

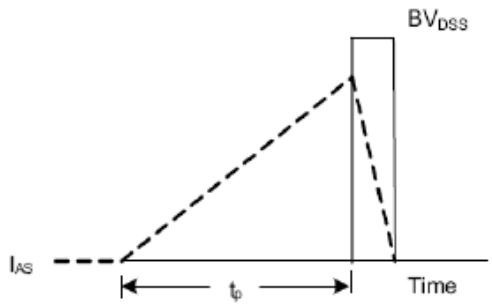


Fig. 4.2 Unclamped Inductive Switching Waveforms

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